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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/996,293	11/28/2001	Yam Mo Wong	P/4076-7	4029

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EXAMINER

EDMONDSON, LYNNE RENEE

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 10/23/2002

4

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

24
Application No.

09/996,293

Applicant(s)

WONG ET AL.

Examiner

Lynne Edmondson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to because neither the drawings nor reference numbers are clear. The drawing lines are very faint. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance. Appropriate correction is required.

INFORMATION ON HOW TO EFFECT DRAWING CHANGES

1. Correction of Informalities -- 37 CFR 1.85

New corrected drawings must be filed with the changes incorporated therein. Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and centered within the top margin. If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings **MUST** be filed within the **THREE MONTH** shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may **NOT** be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

2. Corrections other than Informalities Noted by Draftsperson on form PTO-948.

All changes to the drawings, other than informalities noted by the Draftsperson, **MUST** be made in the same manner as above except that, normally, a highlighted (preferably red ink) sketch of the changes to be incorporated into the new drawings **MUST** be approved by the examiner before the application will be allowed. No changes will be permitted to be made, other than correction of informalities, unless the examiner has approved the proposed changes.

Timing of Corrections

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Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.185(a). Failure to take corrective action within the set (or extended) period will result in **ABANDONMENT** of the application.

Specification

2. A substitute specification including the claims is required pursuant to 37 CFR 1.125(a) because the entire disclosure is faint and not clear.

A substitute specification filed under 37 CFR 1.125(a) must only contain subject matter from the original specification and any previously entered amendment under 37 CFR 1.121. If the substitute specification contains additional subject matter not of record, the substitute specification must be filed under 37 CFR 1.125(b) and must be accompanied by: 1) a statement that the substitute specification contains no new matter; and 2) a marked-up copy showing the amendments to be made via the substitute specification relative to the specification at the time the substitute specification is filed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3 is rejected under 35 U.S.C. 102(b) as being anticipated by Steranko et al. (USPN 3840169).

Steranko teaches a wire bonding apparatus for forming electrical connections on a circuit board comprising a plurality of bond heads (11) and a plurality of work holders (not numbered beneath circuit boards) separated by gaps resting on a common lower chassis (14) wherein the bondheads are individually controlled (figure 1 and col 2 line 55 – col 3 line 15). Although the reference does not teach the spacing for the purpose of vibration isolation as the structure is the same it is presumed to provide the same result. See also claims 1, 2 and 5-9.

4. Claims 1 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Furuya et al. (USPN 3973713).

Furuya teaches a wire bonding apparatus for forming electrical connections between a semiconductor chip and leadframe comprising a plurality of bond heads (9) and a plurality of work holders (tables) operated by a minicomputer comprising a housing containing stored electronic components (cassettes) (col 2 line 39 – col 3 line 36). See also Furuya claims 1, 3-7 and 10-16.

5. Claims 1, 2, 4-9 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Hatakenaka et al. (USPN 4301958).

Hatakenaka teaches a wire bonding apparatus for forming electrical connections between a semiconductor chip and leadframe comprising a plurality of bond heads (3, 5a-5c) and a plurality of work holders (tables, 54) separated by gaps for bonding different types of wires (figures 1-3 and col 2 line 45 – col 3 line 5). Although the

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reference does not teach the spacing for the purpose of vibration isolation as the structure is the same it is presumed to provide the same result. The work holders are slideable on a track (conveyors) with indexing (positioning) means (col 5 line 65 – col 6 line 41) and transporting rollers (col 3 lines 62-66). The apparatus includes lifting means for moving the leadframe from the storage means (magazine) which includes a controller and loading and unloading means (toward and away from holder and line) (col 3 lines 9-42 and col 5 lines 1-55). Components and drivers are housed in the storage means (col 7 lines 19-43). The bond heads are capable of bonding different types of wire including but not limited to gold and aluminum, etc and are capable of performing different independent operations (col 6 lines 43-60). See also Hatakenaka claims 1, 2 and 7-17.

6. Claims 1-9 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Nomura (JPN 05-218124 A).

Nomura teaches a wire bonding apparatus for forming electrical connections between a semiconductor chip and leadframe comprising a plurality of bond heads (C5-C7) and a plurality of work holders (tables) separated by gaps resting on a common lower chassis (chain) (figures 1, 2 and 12 and translation page 1, paragraph [0003]). Although the reference does not teach the spacing for the purpose of vibration isolation as the structure is the same it is presumed to provide the same result. The work holders are slideable on a track (rails) with indexing (positioning) means and transporting rollers (translation page 2, paragraphs [0005] - [0007]). The apparatus

includes lifting means for moving the leadframe from the storage means (magazine) which includes a controller and loading and unloading means (toward and away from holder and line) (page 2, paragraph [0007] –page 3 paragraph [0012] and page 6, paragraph [0036] – page 7, paragraph [0039]). Components and drivers are housed in the storage means (page 4, paragraph [0017] – [0023]). The control means comprises a microprocessor with control circuits (page 5, paragraph [0027]-[0028] and page 9, paragraph [0055] – [0057]). The bond heads are capable of bonding different types of wire including but not limited to gold and aluminum, etc (page 1, paragraph [0004]). See also Nomura claims 1-5.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya et al. (USPN 3973713) in view of Anderson (USPN 4407416).

Furuya teaches a wire bonding apparatus for forming electrical connections between a semiconductor chip and leadframe comprising a plurality of bond heads (9) and a plurality of work holders (tables) operated by a minicomputer comprising a housing containing stored electronic components (cassettes) (col 2 line 39 – col 3 line 36). However, the minicomputer is not further disclosed.

Anderson teaches a microcomputer controller device comprising control circuits housed in a cardcage with a fan and heat sink for mounting components to circuit boards (col 3 line 55 – col 4 line 5 and col 12 lines 10-17).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ heat sinks and fans in the microprocessor housing as is conventional to protect the control circuits which would typically be contained in a cardcage for accurate, reliable control (Furuya, col 5 lines 29-44).

8. Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nomura (JPN 05-218124 A) in view of Brotherton et al. (USPN 6108204).

Nomura teaches a wire bonding apparatus for forming electrical connections between a semiconductor chip and leadframe comprising a plurality of bond heads (C5-C7) and a plurality of work holders (tables) separated by gaps resting on a common lower chassis (chain) (figures 1, 2 and 12 and translation page 1, paragraph [0003]). Although the reference does not teach the spacing for the purpose of vibration isolation as the structure is the same it is presumed to provide the same result. The work holders are slideable on a track (rails) with indexing (positioning) means and transporting rollers (translation page 2, paragraphs [0005] - [0007]). The apparatus includes lifting means for moving the leadframe from the storage means (magazine) which includes a controller and loading and unloading means (toward and away from holder and line) (page 2, paragraph [0007] –page 3 paragraph [0012] and page 6, paragraph [0036] – page 7, paragraph [0039]). Components and drivers are housed in

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the storage means (page 4, paragraph [0017] – [0023]). The control means comprises a microprocessor with control circuits (page 5, paragraph [0027]-[0028] and page 9, paragraph [0055] – [0057]). The bond heads are capable of bonding different types of wire including but not limited to gold and aluminum, etc (page 1, paragraph [0004]). However, the microprocessor is not further disclosed.

Brotherton teaches a microcomputer controller device comprising control circuits housed in a cardcage with a fan and heat sink for mounting components to circuit boards (col 3 line 48 – col 4 line 5 and col 4 lines 52-67).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ heat sinks and fans in the microprocessor housing as is conventional to protect the control circuits (Nomura, page 5, paragraph [0028] and page 12, paragraph [0071] which would typically be contained in a cardcage for control in a convenient and reliable manner.

9. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nomura (JPN 05-218124 A) in view of Tsumura (USPN 4821944).

Nomura teaches a wire bonding apparatus for forming electrical connections between a semiconductor chip and leadframe comprising a plurality of bond heads (C5-C7) and a plurality of work holders (tables) separated by gaps resting on a common lower chassis (chain) (figures 1, 2 and 12 and translation page 1, paragraph [0003]). Although the reference does not teach the spacing for the purpose of vibration isolation as the structure is the same it is presumed to provide the same result. The work

holders are slideable on a track (rails) with indexing (positioning) means and transporting rollers (translation page 2, paragraphs [0005] - [0007]). The apparatus includes lifting means for moving the leadframe from the storage means (magazine) which includes a controller and loading and unloading means (toward and away from holder and line) (page 2, paragraph [0007] –page 3 paragraph [0012] and page 6, paragraph [0036] – page 7, paragraph [0039]). Components and drivers are housed in the storage means (page 4, paragraph [0017] – [0023]). The control means comprises a microprocessor with control circuits (page 5, paragraph [0027]-[0028] and page 9, paragraph [0055] – [0057]). The bond heads are capable of bonding different types of wire including but not limited to gold and aluminum, etc (page 1, paragraph [0004]). However, copper wire is not disclosed.

Tsumura teaches copper as an equivalent of gold an aluminum wires (col 4 lines 56-63) for wire bonding semiconductor chips to leadframes (col 1 lines 5-12) wherein the wire may have different diameters (25-30 microns) (col 3 lines 40-60 and col 4 lines 54-64).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ copper wire as it is a known equivalent of gold wire in semiconductor bonding.

10. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nomura (JPN 05-218124 A) in view of Kinnaird (USPN 5839640).

Nomura teaches a wire bonding apparatus for forming electrical connections between a semiconductor chip and leadframe comprising a plurality of bond heads (C5-C7) and a plurality of work holders (tables) separated by gaps resting on a common lower chassis (chain) (figures 1, 2 and 12 and translation page 1, paragraph [0003]). Although the reference does not teach the spacing for the purpose of vibration isolation as the structure is the same it is presumed to provide the same result. The work holders are slideable on a track (rails) with indexing (positioning) means and transporting rollers (translation page 2, paragraphs [0005] - [0007]). The apparatus includes lifting means for moving the leadframe from the storage means (magazine) which includes a controller and loading and unloading means (toward and away from holder and line) (page 2, paragraph [0007] –page 3 paragraph [0012] and page 6, paragraph [0036] – page 7, paragraph [0039]). Components and drivers are housed in the storage means (page 4, paragraph [0017] – [0023]). The control means comprises a microprocessor with control circuits (page 5, paragraph [0027]-[0028] and page 9, paragraph [0055] – [0057]). The bond heads are capable of bonding different types of wire including but not limited to gold and aluminum, etc (page 1, paragraph [0004]). However, different wire diameters and patterns are not disclosed.

Kinnaird teaches a multi-tool bonder (col 3 lines 1-27 for forming different patterns on a semiconductor device (col 1 lines 10-25) using different types of wires having different diameters (col 2 lines 10-20). See also Kinnaird claims 1-10.

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ copper wire as it is a known equivalent of gold wire in

semiconductor bonding and since the bonders are independently controlled, they are capable of forming different patterns.

11. Claims 15 -17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatakenaka et al. (USPN 4301958) in view of Carlomagno et al. (USPN 5189507).

Hatakenaka teaches a wire bonding apparatus for forming electrical connections between a semiconductor chip and leadframe comprising a plurality of bond heads (3, 5a-5c) and a plurality of work holders (tables, 54) separated by gaps for bonding different types of wires (figures 1-3 and col 2 line 45 – col 3 line 5). Although the reference does not teach the spacing for the purpose of vibration isolation as the structure is the same it is presumed to provide the same result. The work holders are slideable on a track (conveyors) with indexing (positioning) means (col 5 line 65 – col 6 line 41) and transporting rollers (col 3 lines 62-66). The apparatus includes lifting means for moving the leadframe from the storage means (magazine) which includes a controller and loading and unloading means (toward and away from holder and line) (col 3 lines 9-42 and col 5 lines 1-55). Components and drivers are housed in the storage means (col 7 lines 19-43). The bond heads are capable of bonding different types of wire including but not limited to gold and aluminum, etc and are capable of performing different independent operations (col 5 lines 47-55 and col 6 lines 43-60). However, the wires and operations are not further disclosed.

Carlomagno teaches gold, copper and aluminum wires as equivalents for bonding chips to lead frames. The wires can have different diameters (25-375 microns) (col 3 line 53

– col 4 line 19) and form different patterns (directions) (col 7 lines 37-58 and col 8 lines 19-46).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ copper wire as it is a known equivalent of gold wire in semiconductor bonding and since the bonders are independently controlled, they are capable of forming different patterns (Hatakenaka, col 5 lines 47-55 and col 6 lines 43-60) in an efficient and cost-effective manner (Hatakenaka, col 1 lines 46-64).

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Jin et al. (USPN 5979739, plurality of bonding tools, track, storage, rollers, lift), Marks et al. (USPN 4551912, multiple tools), Stora et al. (USPN 5680294, controller with fans and heat sink), Mimata et al. (USPN 4890780, fans, bonding device), Campbell et al. (USPN 4985804, computer housing, fans), Richardson (USPN 4595820, controller with fans and heat sink) and Bailey (USPN 5530284, wire bonding different wire types).

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynne Edmondson whose telephone number is (703) 306-5699. The examiner can normally be reached on M-F from 7-4 with alternate Fridays off.

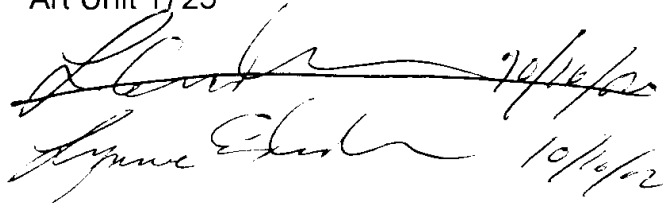
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (703) 308-3318. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-7118 for regular communications and (703) 305-7115 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.

Lynne Edmondson
Examiner
Art Unit 1725

LRE
October 16, 2002

 7/16/02
Lynne Edmondson 10/16/02